NEWSLETTER

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NEWSLETTER

VOLUME 17 NUMBER 3

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THE AUSTRALIAN SOCIETY FOR LIMNOLOGY

The Australian Society for Limnology is an association of over 300 people with professional or amateur interests relating to Australian inland waters. Since its inception in 1961 the Society has played an important role in fostering limnological work in this country. The ASL promotes liaison between limnologists in academic, private and governmental institutions, and has a vested interest in the conservation of aquatic and related resources. Annual congresses are held near centres of limnological interest, and the programme includes scientific sessions, field excursions, and social activities

The ASL produces a Newsletter with notes on activities, articles of general interest, book reviews, and congress announcements, and an occasional Special Publication. A further periodical publication is the Directory of Australian Limnologists.

Membership applications are welcomed; four classes of subscribing membership are catered for:

Ordinary members	($10.00 p.a.)
Student members	($4.00 p.a.)
Institutional members	($10.00 p.a.)
Sustaining members	($50.00 p.a. or more)
Affiliated bodies	(subs on application)

NOTE: Members are entitled to receive the Aust. J. Mar. Freshwat. Res. at a reduced rate ($7.50).

Subscriptions cover the period 1 July to 30 June.

Details are available from:

I. Campbell Esq.
Hon. Sec./Treasurer, A.S.L.
Department of Chemistry
Caulfield Institute of Technology
P.O. Box 197
Caulfield East, Victoria 3145

Newsletter contributions are always welcome, and correspondence should be addressed to the Newsletter editor. The deadline for the next issue is June 15, 1980

ASL EXECUTIVE 1979-1980

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NEWS, ANNOUNCEMENTS AND REQUESTS

Australian Society for Limnology Annual Conference

The Annual Conference of A.S.L. will be held in Queenstown from 9-11 May, 1980. Members of the Society should now have the First Circular. Enquiries concerning the Conference should be sent to Dr. P.A. Tyler, Botany Department, University of Tasmania. Enquiries concerning papers at the Conference should be directed to Dr. R. White, Zoology Department, University of Tasmania. Details of the program of the conferences are given in the Conferences section of the Newsletter.

The venue of the conference is a vivid reminder of the effects of mining on the environment. Surrounded by stark multi-coloured mountains, Queenstown sits on the edge of the shrinking wilderness of south west Tasmania. The threat of destruction by inundation now hangs over the wilderness of the Lower Gordon River and the Franklin River.

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GIVE THE YARRA A GO !

In the last week of February "The Age" newspaper launched a strong campaign to clean up and conserve the Lower Yarra River and its immediate environs. Many people including visiting naturalist Harry Butler rate the Yarra as Melbourne's outstanding natural feature. However as you wander down the Yarra from Dights' Falls the lack of care for the river is starkly evident.

The aims of the "Give the Yarra a Go" campaign are:

Turn Batman Car Park into garden (at present this is concrete between Spencer and Queen Street bridges where cars are worshipped).

Bring back the boats. Make a maritime park around the restored barque "The Polly Woodside".

Clean up the water.

Clear a path from the city to Dights' Falls.

Turn the Yarra and its banks into a river park under a single authority.

With support from the State Government and the Melbourne City Council goal one looks as if it will be achieved. The State Government supports the other goals though it has reservations about the creation of a new single authority to control the Yarra. Concerning the goal to clean up the waters of the Yarra, the Premier, Mr. Hamer, said that there was a need for a Government authority to have the power to "trace back the discharges to their source and to do something about it. Whether it should be the Board or the E.P.A., I don't know. I think perhaps the E.P.A."

TELLICO DAM CLOSED

The ability to build dams regardless of need and to destroy by flooding or by changes to downstream flow important environmental attributes is not confined to Tasmania and Victoria (see news on Lower Gordon scheme and Mitchell River Dam in last issue). Possibly our veterate dam-builders gain support for their costly schemes of dubious benefit from overseas dam builders such as the Tennessee Valley Authority.

A vivid account of the completion of the Tellico Dam on the Little Tennessee River is given in a recent issue of the New York Review of Books (Feb. 7, 1980) by Peter Matthessen. His article "How to Kill a Valley" states emphatically "A last-minute amendment insinuated into an Energy and Water Development Appropriations Act last June authorized the Tennessee Valley Authority to complete the Tellico Dam near Knoxville "notwithstanding the Endangered Species Act or any other law." This high-handed and very dangerous precedent is thought to be the first such rider ever to put an unfinished federal construction project beyond all legal restraint. On September 25, President Carter failed to veto HR4388 as he had been urged to do by members of his own cabinet. One of the oldest and most evil-smelling public works project in the country thus achieved through procedural tricks and political blackmail what it had never been able to win in a fair hearing. On November 29, when the flood gates were lowered, a small perch called the snail darter, whose last natural habitat was the last free-flowing stretch of the Little Tennesee River, became the first living creature ever consigned wilfully into oblivion.

Though only one of the many urgent reasons why the Tellico Dam should never have been started, this little fish was taken up by the press and television to the virtual exclusion of more fundamental issues. Even philosophical defenders of the darter became troubled by the trivialized controversy as set out by the dam's advocates and parroted in newspapers and on TV. Did the perpetuation of a "useless" three-inch "minnow" justify the waste and loss of energy that would result from abandoning annearly completed $120-million hydroelectric dam?"

The answer is "no". The area to be flooded contained sacred sites of the Cherokee nation and sites of immense archeological value. The Indians objected to the dam citing the American Indian Religious Freedom Act: "the destruction of their spiritual homeland, which many still visited regularly, would deny religious rights that were guaranteed by the free exercise clause of the First Amendment".

However "On the morning of November 29, without waiting for the Indians' court hearing, the TVA closed the Tellico Dam, and the clear waters of the Little T backed up behind it; in a few weeks, the darter's spawning beds will be silted over. Soon the twenty-fifth artificial lake within sixty miles will rise to flood the Seven Towns, and meanwhile the Cherokee (supported now by the ACLU and the National Council of Churches) will keep on fighting for a hearing in the courts, still hoping the flooding can be stopped before the waters reach their sacred grounds. They have made four desperate appeals to the White House in the last two months without receiving so much as an acknowledgment; and they have abandoned any hope of honest dealing with the TVA.

The Tellico is a transgression against whites as well as Indians. Will we help the Cherokee by demanding an immediate court hearing, or will we permit so much that is vital to our national well-being to be lost forever under the dead waters of Big Money Lake? If the valley is filled, let them drain it again. The cost of opening the dam with dynamite would be the first money for the project that was well spent. The Tellico should stand as a monument, not to the short-sightedness and greed but to the wise prevention of a national calamity; as a symbol and a deterrent, it would more than justify the wasted money. A beautiful river can be

restored, invaluable farmland and historic sites can be recovered without undue damage, and perhaps one day the farmers too will have their day in court. Only a small pretty gleam of river life called the snail darter will have been extinguished, like the old way of the Cherokee before it."

FRESH WATER BIOLOGICAL STATIONS

Recently while reading through the piles of printed matter (I daren't use the word"literature" for some of the papers on my desk) I came upon the following challenging words:

"There can, however, be no question that from the purely scientific point of view, a knowledge of the life histories, habits and inter-relations of fresh-water organisms is of equal importance with similar knowledge concerning marine organisms. It may even be of greater importance in some cases, for there can be little doubt that many of the fundamental biological problems can be answered (if answerable at all by a study of aquatic organisms) more easily by observations upon fresh-water than upon marine forms, because their conditions of existence are less complex. From the practical point of view the claims of fresh-water biology are, it must be admitted, not so great as those of marine biology, but they are by no means inconsiderable, and will tend to become stronger with every increase in the amount of attention paid to fresh-water fishes as food.

Surely it is time, therefore, now that the more pressing need for marine biological stations has been largely satisfied, and the anticipations as to their value are being steadily realised, to consider if the careful study of fresh-water biology in this country cannot be helped forward by the establishment of a properly equipped station. Comparatively, no doubt, a greater amount of work can be done upon fresh-water animals and plants without the aid of a special station, than is possible in the case of marine forms, but it is nevertheless true that there remain a long series of problems in fresh-water biology which will never be solved without the continuity of observations practically only to be secured by means of a station definitely working towards this end."

These exhortatory words, which could apply to the current situation in Australia, were written in 1897 by D.J. Scourfield in a paper entitled "Wanted, a British Fresh-water Biological Station".

In 1899 in a paper "Fresh-water Biological Stations: America's example" Scourfield continued his lament for the British situation. "When will our biologists wake up to the fact that good systematic work can be done and important biological problems attacked by fresh-water as well as marine stations? When shall we be able to report to our Continental and American confrères that, in the words of Dr. Fritsch, England has done her duty by fresh-water biology? Unfortunately it is only too true that up to the present England has not done her duty in this matter, and as a striking instance of this it may be pointed out that of the very considerable knowledge which we now possess about the organisms constituting the plankton of fresh-water lakes - e.g. their remarkable and often complicated variations in abundance during the year, both collectively and taken species by species, their vertical distribution in regard to the season, to the time of day, to the so-called "Sprungschicht", their occasional seasonal variation of form, their relation to one another and to the other lake forms, notably the fishes, - of all this and much more not one single fact has been contributed by this country! Who said "Shame"?

While the need for nations to do their duty is not so pressing in these days of corporate imperialism, there are many limnological problems especially those of a long-term nature which would no doubt be solved effectively if Australian limnology was given adequate support. A centre of Inland Waters Research in Australia would be a good step in the right direction.

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CONFERENCE REPORT

International Symposium on Athalassic (Inland) Salt Lakes

This conference was held in October, 1979, in Adelaide. The venue of the conference was the Rymill Conference Centre. The conference was attended by 50+ participants from a variety of countries: Australia, Japan, U.S.A., England, Holland, Belgium, Germany, Austria, Yugoslavia.

On the Tuesday night (October 23), most conference participants went to, and some returned from, the Southern Vales Wine Bushing Festival while on Wednesday there was an excursion to the I.C.I. Dry Creek Salt Works north of Adelaide. As our correspondent (W.D.Williams) writes:

"And on Friday, many participants had dinner in the Bistro Club at the University of Adelaide after a sherry party in the Zoology Department.

Following the formal proceedings of the conference there was an eight-day expedition to Lake Eyre, the Flinders Ranges, Yorke Peninsula, Coorong area and western Victoria. Twenty-seven set out on this expedition in three light planes from Adelaide airport, but by the time Melbourne was reached 8 days later, the party had decreased to 16! I gather participants enjoyed the expedition, found the distances long, the schedule too tight, and the weather superb. In brief, the expedition flew from Adelaide to Andamooka, went then to Lake Torrens by ground transport, flew from Andamooka to Muloorina Station (via Lake Eyre South, Lake Eyre North), and then bussed and camped the rest of the way.

Editing the proceedings for publication is now in hand.

Titles of papers given at the conference

1. Athalassic (inland) salt lakes: an introduction. W.D.WILLIAMS (Australia).
2. Aquatic plant communities of poikilohaline waters. C. DEN HARTOG (Holland).
3. Charophytes in salt lakes: occurrence and geological significance. R.V.BURNE, J. BAULD and P. DE DECKKER (Australia).
4. The ecology of halophytes of saline lakes in the south-east of South Australia. M. BROCK (Australia).
5. The microflora: adaptations to life in extremely saline lakes. L.J. BOROWITZKA (Australia).
6. Primary production in saline lakes: a review. U.T. HAMMER (Canada).
7. Microbiology of the Great Salt Lake, Utah. F.J. POST (U.S.A.)
8. Photosynthetic rates and population dynamics of phytoplankton in Kenyan soda lakes. J. MELACK (U.S.A.)
9. Blood osmoregulation and temperature in crustaceans. J. DORGELO (Holland).
10. Responses of some calanoid copepods to existence in saline waters. G.W.BRAND (Australia).

11. Ostracods of athalassic saline lakes: a review. P. DE DECKKER (Australia).

12. On the colour of Diaptomus nevadensis in two North American lakes of differing salinities. N.G. HAIRSTON, Jr. (U.S.A.).

13. Animal communities in three Victorian lakes of differing salinity. B.V. TIMMS (Australia).

14. Salt lakes in Yugoslavia. G. PETROVIĆ (Yugoslavia)

15. On the chemistry and biology of some saline lakes in Western Australia. M.C.GEDDES, P. DE DECKKER, W.D. WILLIAMS, D. MORTON AND M. TOPPING (Australia and U.S.A.).

16. Rotifers from Iran in relation to the chemistry of the waters. A. RUTTNER-KOLISKO (Austria).

17. The ecology of plankton fauna in saline river pools. R.J. RIPPINGALE (Australia).

18. Living and fossil Quaternary Foraminifera from athalassic saline lakes, southern Australia. J. CANN and P. DE DECKKER (Australia).

19. Palaeo-hydrological regimes in Lakes Keilambete, Tyrell and Frome. J. BOWLER (Australia).

20. Late Quaternary pollen records of Lake Frome, South Australia. G. SINGH (Australia).

21. Late Cainozoic palaeoenvironments of the Tarkarooloo Basin (Lake Frome area, South Australia), as suggested by non-marine molluscan assemblages. M.F. BUONAIUTO (Australia).

22. Lake Dieri resurrected? R.A. CALLEN (Australia).

23. Palaeobiogeography of some salt lake faunas. K.G. McKENZIE (Australia)

24. Deep coring study of Lake Biwa and palaeolimnological work on relict lakes of the world. S. HORIE (Japan).

25. Antarctic saline lakes: a review. H. BURTON & S. WRIGHT (Australia)

26. Microbial ecology of an Antarctic saline meromictic lake. R.M. HAND & H. BURTON (Australia)

27. Antarctic saline lakes and cyanobacterial mats: modern analog of Precambrian glacial sediments. M.R. WALTER & J. BAULD (Australia)

28. The limnology of saline lakes in western Victoria, Australia: a review of recent studies. W.D. WILLIAMS (Australia).

29. Limnologic studies on the desert playa lakes of southern California, U.S.A. D.M. KUBLY (read by G.A. COLE) (U.S.A.).

30. The ecosystem of hypersaline lagoons in Laysan atoll and on the Hawaiian island Kauai. H. CASPERS (Germany)

31. Kratergöl,a deep hypersaline crater-lake in the steppic zone of Western Anatolia (Turkey), subject to occasional limno-meteorological perturbations. H.J. DUMONT (Belgium).

32. Biotechnology of solar saltfields. A.G. JONES, C.M. EWING and M.V. MELVIN (Australia).

33. Limnology of a North American terminal lake, Pyramid Lake, Nevada, U.S.A. D. GALAT, E.L. LIDER, S. VIGG and S. ROBERTSON (U.S.A.)

34. Lakes and flamingoes of the Central Andes: an illustrated overview. S. H. HURLBERT (U.S.A.)

WATER ANALYSIS AND HEAVY METALS NEWSLETTER

The Australian Water Resources Council has recently agreed to finance the production of a specialist newsletter on Water Analysis and Heavy Metals under the editorship of Dr. B.T. Hart. The intention of the Newsletter is to provide better communication than exists at present between scientists working in the fields of water analysis or heavy metals. It is anticipated that the Newsletter will contain items on the results of current projects, new analytical methods, modifications of existing analytical methods, etc. The newsletter will be established initially on a one year trial basis and will comprise 2-3 issues per year. Contributions and enquiries to Dr. B. Hart, Head, Water Studies Centre, Caulfield Institute of Technology, P.O. Box 197, Caulfield East, Vic.3145.

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CONVENTION ON WETLANDS OF INTERNATIONAL IMPORTANCE

Request for information

Australia became the first party to the Convention on Wetlands of International importance when it signed, without reservation to ratification, on 8 May 1974. The Convention places obligations on contracting parties to nominate and conserve key wetland areas considered to be of international importance.

To date Australia has nominated only one such area, the Coburg Peninsula Flora and Fauna Reserve and Wildlife Sanctuary in the Northern Territory.

The Australian National Parks and Wildlife Service has a responsibility, as "the designated authority" under the terms of the Wetlands Convention, to keep other countries informed of current and projected activities relating to wetlands and waterfowl, together with information on nominated wetland areas.

Thus the service is seeking information on any current or projected research on wetlands and/or waterfowl.

IUCN plans to convene a Technical Conference under the terms of the Wetlands Convention, to be held in Cagliari, Sardinia, in November 1980. This will provide a good opportunity for Australia to bring its research to the attention of other signatories to the Wetlands Convention. It will also facilitate a valuable exchange of data and techniques on wetland and waterfowl research and conservation.

Any information that can be provided to assist in the preparation of national submission to the Technical Conference will be appreciated. The following format is suggested.

1. Organization or authority
2. Chief Investigator
3. Subject and location of study
4. Nature of research
5. Anticipated duration
6. Summary of findings to date
7. Publications resulting from this Research

Enquiries and information should be sent to

Mr. Longmore
Australian National Parks and Wildlife Service,
P.O. Box 636,
CANBERRA CITY A.C.T. 2601.

REQUEST FOR SPECIMENS

Dr. W.F. Ponder, Curator of Molluscs at the Australian Museum, Sydney, is revising the group of aquatic snails that live in springs and other underground sources of water. No doubt there are some members of the Society who have collected or are collecting animals in such waters. It would be greatly appreciated if any small gastropods from such waters could be sent to Dr. Winston F. Ponder, The Australian Museum, P.O. Box A285, Sydney South, N.S.W. 2000.

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REQUEST FOR INFORMATION AND CONTACT

Keryn Kefous at the Australian National University, who has just joined the Society, is engaged in research on archeological sites around lakes in western N.S.W., in particular at Lake Victoria. Keryn would like to contact research workers concerned with lacustrine biology in Australia in particular research workers interested in the ecology of freshwater mussels and Pleistocene freshwater fish. Address: Keryn Kefous, Department of Prehistory, School of General Studies, The Australian National University, Box 4, P.O., Canberra, A.C.T. 2600.

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REQUEST FOR JOURNAL BACK NUMBERS

WAnted to Buy: the following issues of the Australian Journal of Marine and Freshwater Research (AJMFR).

Vol. 12, No.2 (1961)
Vol. 14, No.1 (1963)
Vol. 15, No.1 (1964)

Would anyone having a spare copy of any of these numbers please write to Ian Bayly, Zoology Department, Monash University, Clayton, Victoria 3168.

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O B I T U A R Y

It was with shock and deep regret that the Botany Department, University of Tasmania, heard of the death of Michael Steane in a mountaineering accident in New Zealand.

After an outstanding undergraduate record, Michael took First Class Honours in 1979 for his work on the thermal and spectral properties of montane lakes. His love of high and wild places made the arduous task of montane limnology a natural choice for his Honours work and he obtained excellent results, sometimes under appalling conditions, from a number of mountain ranges in Tasmania and on Macquarie Island. In winter or summer, on foot, by helicopter or by pack horse, he took rubber boats, echo sounders, light sensors, samplers and chemical kits into some of Tasmania's most remote lakes. When published, his results will make a major contribution to our knowledge of the wide variety of Tasmanian lakes.

The small lakes of the mountains were not his only concern. Michael studied Gordon Reservoir over a twelve month period and accurately determined the seasonal behaviour of the lake, its inflows and their chemical influences. At the time of his death he was planning to continue this work and his loss will be keenly felt academically. More than this, his cheery character and classical whistle will be missed by all occupants of the limnology laboratories. The Department and the Australian Society for Limnology extends sympathy to all his family and friends.

C O N F E R E N C E S

Australian Society for Limnology 1980 Conference

Venue - Queenstown, Tasmania

Dates - 9-11 May, 1980.

Programme

Friday 9 May, 1700 onwards. Registration at the Cabaret Room, Empire Hotel.

Saturday 0915-1200 - Mini-Symposium: The South West Tasmanian Wilderness and Its Future". Invited speakers from H.E.C. South West Tasmania Resources Survey, Tasmanian Wilderness Society, followed by papers on aspects of the freshwater biology of the south-west.

1200 Jolly address.

1400-1730 Offered papers

1930 onwards - Annual dinner.

Sunday 0900-1030. Offered papers
1030-1200. Annual General Meeting
1200. Depart with packed lunch for scenic flights (1½ hours over South West Tasmania) or boat trip up Gordon River.

Enquiries concerning Conference to Dr. P.A. Tyler, Department of Botany, University of Tasmania, Hobart, or Dr. A.M. Richardson, Department of Papers to Dr. R. White, Department of Zoology, University of Tasmania, Box 252C, G.P.O., Hobart.

Australian Society for Fish Biology

SEVENTH ANNUAL A.S.F.B. CONFERENCE, COWES, PHILLIP ISLAND, 15-17 AUGUST 1980.

The 1980 A.S.F.B. conference will be held at the Continental Resort and Conference Centre, Cowes, Phillip Island, Victoria, on the weekend of 15, 16 and 17 August.

Accommodation at the Continental is $32 per person per day and includes Breakfast, lunch and dinner and conference fees (use of conference room and equipment, morning and afternoon teas). The annual dinner is included in the price and one of the lunches will be an outside barbeque.

Accommodation is booked for the period Friday 15 August to Sunday 17 August; i.e. Friday, Saturday and Sunday nights. The Continental can accommodate about 90 people and will organise accommodation for the overflow in two nearby hotel-motels. A local caravan park will take those people looking for cheaper accommodation.

The Victorian Fisheries Research Vessel "Sarda" will be available for trips on Friday 15 and Monday 18 August. It is expected that sightseeing tours around Phillip Island will be available.

Conference registration forms, the conference itinerary, transport arrangements and the call for papers will be forwarded to all members and relevant institutions in May.

Information from Australian Society for Fish Biology, N.S.W. State Fisheries, P.O. Box N211, Grosvenor Street, Sydney, N.S.W. 2000.

CONFERENCES (continued)

Ecological Society of Australia Inc.
Biennial Symposium: Ecological Gradients and Boundaries

Dates: 12-13 May 1980
Venue: University of Melbourne, Parkville, Victoria.

List of papers:

P. Wardle, Alpine timberlines.
D.Ashton & A. Griffith, Eucalypt forest boundaries
A. Chiffings and A. McComb, Phytoplankton
M. Austin, Vegetation environmental gradients
J. Kikkawa, L. Webb, G. Tracey and W. Williams, Palaeoecology and Australian tropical rain forest.
A. Gillisen, Australian woody edge communities
J. Bunt, Mangroves
M. Canny, A Universe created by severing a space
S. Kessell, Gradient analysis and resource management
S. Stanley, Drosophila ecological gradients
G.Watson, Boundaries in amphibians
E. van Buerden, Bufo marinus spread
A. Meats, Bioclimatic potential of Dacus tryoni
S. Brandt, Oceanic fronts as ecotones and barriers
C. Bull, R. Sharrad and T. Petney, Ticks on Australian reptiles
C. Moran, Hybrid zones and genetic demarcation
H. Heatwole, Ant communities
A. Underwood, Intertidal communities.

Enquiries to: Dr. P.Y. Ladiges, E.S.A. Symposium, School of Botany, University of Melbourne, Parkville, Victoria 3052.

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SIL XXI CONGRESS AND AN ASSOCIATED SYMPOSIUM - 24-31 AUGUST 1980

The XXI Congress of International Association of Theoretical and Applied Limnology (SIL) will be held at Kyoto International Conference Hall, Kyoto, Japan.

Details from Professor T. Miura, Secretary-General of the XXI SIL Congress, c/- Otsu Hydrobiological Station, Kyoto University, Shimosakamoto, Otsu, 520-01, Japan.

(a) Systematics of Microscopical Biota - planned symposium

Professor M. Sudzuki is planning a symposium, during, before or after the Congress for people attending SIL who are interested in the Systematics of Microscopical Biota (e.g. particularly animals - Protozoa, Turbellaria, Rotifera, Tardigrada) and/or microscopical biota and water pollution. He hopes to print the papers given at this meeting, thus Professor Sudzuki would like to know which people are coming to Japan, in which of the two suggested topics they are most interested, when would be the most convenient time for a symposium, and whether or not those interested in the symposium will be submitting a paper?

Those interested are urged to write to Professor M. Sudzuki, Mihon Daigaku, Biological Laboratory, OMIYA-SHI, Higashi-Arai, Saitama-Ken, Japan.

(b) Workshop on measurement of photosynthetic pigments in fresh waters and Standardization of Methods:
This will be held in July 1980 at Plon, West Germany. Enquiries to Dr. H. Rai, Max-Planck-Institut für Limnologie, 2320 Plon/Holstein, West Germany.

(c) Third International Symposium on Palaeolimnology

This symposium is scheduled to be held in Joensuu, Finland, between September 1-8, 1981. Contact Dr. P. Huttunen, Karelian Institute, University of Joensuu, P.O. Box 111, SF-80101, Joensuu 10, Finland for details.

XIII International Botanical Congress, SYDNEY, Australia - 21-28 August 1981.

Section 10 - Marine and Freshwater Botany (Chairman Section 10 Committee - Professor H.B.S. Womersley, Department of Botany, University of Adelaide, South Australia 5000).

The section will meet throughout the Congress, and will give the opportunity for symposium and paper sessions on a variety of phycological topics as well as on seagrasses and mangroves. It is anticipated that papers to be presented verbally will be selected but that all other papers offered can be tabled as abstracts or full accounts by the authors; poster displays can be arranged.

ANZAAS Jubilee Congress

Theme: Science for a Sustainable Society for us by 2000 AD. Why? How?

Anzaas will be held in Adelaide from 12-16 May 1980. Of interest to limnologists are the following:

(a) Congress "Symposiums" (or Symposia) No. 11 Management of Water Resources - enquiries to Professor W.D. Williams, Department of Zoology, The University of Adelaide, Box 498, G.P.O. Adelaide, S.A. 5000.
No. 23. Trace Pollutants - enquiries to Dr Peter Davis, Waite Agricultural Research Institute, Glen Osmond, S.A. 5064.

(b) Sectional meetings

Section 2. Chemistry - session on water
Section 11 and 12 - the Murray-Darling

All general Congress enquiries should be addressed to. Jubilee ANZAAS Congress, 141 Rundle Mall, Adelaide, S.A. 5000.

MANAGEMENT OF WATER RESOURCES (Wednesday, 14 May, 1980, 2-5 p.m.)

(Enquiries to Professor W.D. Williams, Department of Zoology, University of Adelaide, G.P.O. Box 498, Adelaide, S.A. 5001.)

Convenor: Professor W.D. Williams

Chairman: Mr. P.B. Arnold, Minister for Water Resources, South Australia.

Speakers: Mr. R.A. Perry, Chief, CSIRO Division of Land Resources Management, Wembley, W.A. 6014.

Senator J.L. Carrick, Minister for National Development and Energy, Canberra, A.C.T. 2600.

Mr. A.G. Strom, Director, Gutteridge, Haskins & Davey Pty. Ltd., Consulting Engineers, Melbourne, Vic. 3000.

Professor W.D. Williams, Department of Zoology, University of Adelaide, S.A. 5001.

The shortage of supplies of fresh water is a major constraint upon development for most of Australia; whereas Australia is bountifully provided with supplies of most natural resources, this is not the case with regard to water. In Australia, the driest of all continents, such water resources as occur need careful husbanding and management. This symposium will deal with the extent of the problem as perceived and consider some approaches to its solution.

SHORT NOTICES

1. Second International Symposium on Biology and Management of Mangrove and Tropical Shallow Water Communities. This conference sponsored by the University of Papua New Guinea and the Western Society of Naturalists is to be held in Port Moresby from 20-27 July 1980 followed by a week of field work (27 July-2 August) centred on Madang. Details from the Western Society of Naturalists, Professor D.H. Montgomery, Biological Sciences Department, California Polytechnic State University, San Luis Obispo, California 93407, U.S.A.

2. A Symposium on the Cainozoic evolution of continental south-east Australia. This conference sponsored by the Commonwealth Territories Division, Geological Society of Australia, and the Bureau of Mineral Resources will be held in Canberra in November or December 1980. Enquiries to Graham Taylor, School of Applied Science, C.C.A.E., P.O. Box 1, Belconnen, A.C.T. 2616, Australia.

3. Hydrology and Water Resources Symposium 1980. This conference sponsored by the Institution of Engineers, Australia, and the Hydrological Society of South Australia will be held in Adelaide from 4-6 November 1980. All correspondence relating to the Symposium to: The Conference Manager, Institution of Engineers, 11 National Circuit, Barton, A.C.T. 2600.

4. Erosion and Sediment Transport in Pacific Rim Steeplands this international symposium will be held at the University of Canterbury, Christchurch, New Zealand, from 25-31 January 1981. Enquiries to: 1981 Symposium, P.O. Box 737, Christchurch, New Zealand.

5. Fifth International Palynological Conference 6-8 July 1980. Venue: Cambridge. Details from: Mrs G.E. Drewery, Geological Department, Sedgwick Museum, Downing Street, Cambridge CB2 3EQ, U.K.

6. 8th International Congress of Arachnology 7-12 July 1980 Venue: Vienna. Details from: Professor Dr H. Nemenz, Institut für Zoologie, Universität für Bodenkultur, Gregor-Mendelstr. 33, A-1180 Wien, Austria.

7. Application of Dynamic Programming to Water Resources Management: sponsored by Research Institute of Colorado. Date June 23-27, 1980. Venue: Research Institute of Colorado, Fort Collins, Colorado. Enquiries to Mrs Kristine L. Schneider, Research Institute of Colorado, Drake Creekside Two, 2625 Redwing, Suite 200, Fort Collins, Colorado 80526, U.S.A.

8. Fourth International Coral Reef Symposium Venue: Manila. Philippines. May 18-22, 1981. Enquiries to Marine Sciences Centre, University of the Philippines, P.O. Box 1, Diliman, Zuecon City, Philippines.

9. Second International Symposium on Microbial Ecology. 7-12 September 1980. Venue: University of Warwick. Details from: Dr. Madilyn Fletcher, Department of Environmental Sciences, University of Warwick, Coventry CV4 7AL, U.K.

SOCIETY BUSINESS

Minutes of Executive Committee Meeting, held at 10.45 pm on Sunday, 20 May, 1979, in the Ormidale Sports Centre, Tallangatta, Vic.

PRESENT: P.Tyler(Chairman), S.Lake, I.Campbell, K.Bishop, B.Chessman, R.Oliver, D.Pollard, A.Richardson, B.Richardson, R.White, I.Bayly.

APOLOGIES: I.McKelvie

1. Editorial Committee: I.Bayly, S.Lake and J. Powling were appointed as the Editorial Committee.

2. Newsletter Editor: S. Lake was reappointed Newsletter Editor.

3. Jolly Award Committee: I.Campbell was requested to write to J.Wharton thanking him on behalf of the executive for his service to the Jolly Award Committee, and to I.Bayly, inviting him to act as Chairman of the Committee.

4. D. Pollard suggested that the executive consider the idea of an ASL student prize, along the lines of that run by the ASFB. It was agreed that this should be considered at the next executive meeting.

5. 19th Annual Congress: K.Bishop, D.Pollard and P.Tyler were delegated to discuss the possibility of holding the 19th Congress at Jabiru with the supervising scientist, and report at the next meeting.

   A. Richardson, S.Lake and P.Tyler were delegated to investigate the costs and facilities available, if the Congress was held at a location on the West coast of Tasmania, and also report back to the next meeting.

6. Future Meetings: It was agreed that future meetings would be held in late July and mid-November, on a Friday evening or Saturday afternoon. P. Tyler volunteered to act as Convenor for the next meeting. CIT was suggested as a likely venue.

   Meeting closed at 11.15 pm.

Minutes of a Progressive Committee Meeting held in Hobart (13 August 1979), Sydney (15 August 1979), Melbourne (15 August 1979) and Jabiru (30 August 1979).

Present: HOBART - A. Richardson, White, Tyler; SYDNEY - Pollard, Bishop, Tilzey (co-opted), Tyler; MELBOURNE - McKelvie, Lake, Tyler; JABIRU - Bishop, Tyler; BY TELEPHONE - Oliver, Chessman, Tyler (17 August 1979).

Apologies: B.Richardson, I.Campbell.

1. Venue of 1980 Conference. Tyler reported that (1) Jabiru was out of the question on the grounds of cost and accommodation problems. (2) Tasmanian members recommended Queenstown, on the west coast, as the venue for May. This was accepted unanimously. (3) Initial enquiries suggested that the Mt. Lyell Company may make available a conference hall and some cheap, hutted accommodation.

RESOLVED: That Tasmanian members complete feasibility studies of Queenstown for the 1980 conference; that P.S.Lake enquire regarding air charter; and that a circular outlining proposals and costs be circulated to all Society members as soon as feasible.

2. Costs of Conferences A letter signed by student members of Adelaide University was circulated by Tyler to all Committee members. The letter

drew the attention of the Committee to the hardship student members experienced, and asked that this be borne in mind when selecting a venue. An ancillary point was an objection to all-in charges for the Annual Dinner as this led to abstemious members subsidising the drinkers. Both issues were aired at the Annual General Meeting at Tallangatta.

On the first issue the Committee has every sympathy, but reaffirmed a view expressed at Tallangatta that the Society existed for all its members and that, within reason, interesting locations should not be ruled out solely because costs exceeded those if the meeting were held in Victoria. On the other hand, a range of accommodation options from tents to motels would be sought

The second point was accepted, without dissent, as a strategy for catering provided that a system of options in catering could be arranged without controvention of licencing regulations.

ENVIRONMENTAL ASSESSMENT IN LESS DEVELOPED COUNTRIES

These reflections concern Bill Williams' (1979) remarks in his concluding address to "Aquatic Research in Southern Queensland" (A.S.L. Special Publication No. 3, pp. 94-95). The point dealing with Environmental Impact Statements, and environmental work in general, is discussed. However, in my remarks I shall restrict myself only to less developed countries (LDCs).

What does EIS mean for a LDC and why is it recognized as useful assistance for major government decisions in those LDCs which are lucky enough to have enlightened governments? I mean such governments which think in terms of developing the country in harmony with the environment, or with the aim of limiting the negative environmental impact of major developments to a minimum.

Before I touch on the main topic, perhaps I should try to explain some basic problems of LDCs. A LDC usually has a number of constraints: lack of qualified manpower, lack of money, lack of research institutions, lack of time. In some LDCs most university graduates may go directly into the public service, into decision-making roles, without having had any time to gain practical experience in subjects in which they have suddenly become decision-makers. Even in countries with very little industry, the number of environmental problems is alarming. For example, in Papua New Guinea any development giving rise to major environmental disturbance, any major manipulation of the environment, is expected to be assessed for its possible environmental impact: building new wharfs, timber exploitation on large areas, planting exotic trees, creation of new plantations, new mines, damming rivers, use of pesticides, building roads, pollution of water, noise, excessive burning-off, noxious weeds, etc., etc.. Of course, the scrutiny includes also the possible social impact. The number of specialists available to deal with these problems is very limited. The amount of money allocated by the government for various EISs is also limited although sometimes it is not money but political expediency which is the problem as there may be restrictions on the number of external experts which the country can afford without being accused of scientific neo-colonialism.

In some countries there is an Office of Environment or its equivalent, which is usually staffed by experts. They spend most of their time going to meetings and dealing with correspondence and advising in their best capacity and with their best competence. Expatriates on contracts are frequently matched with nationals who are expected to learn from them during the short period of contact. It frequently happens that an expatriate expert is requested to instruct a national in, say, two years about topics which in conditions of developed countries would require 15 to 20 years of specialized experience in which to become proficient. Both the expatriate and the national are usually overloaded with many extra duties which they have to carry out because of lack of skilled supporting personnel.

One interesting aspect of environmental work in LDCs is that money may not be a limiting factor. Money is forthcoming from a number of donors such as governments, institutions and organisations. However, where money is offered by outside organisations, there may be constraints on its use. A condition for use of the money may be, for example, the availability of a national counterpart. But there may be no allowance made for a salary of the national counterpart as this salary is usually considered by foreign donors to be the duty of the receiving government. There may be lack of working space for the experts, or lack of suitable accommodation for them. Again, as an example - there may be a donor willing to spend US$30,000 on a special project, plus providing the salary of an expert, but the expert's accommodation would be an additional cost to the host government, perhaps US$50,000. Many projects do not take place because of lack of national counterparts.

/Once

Once I attended a meeting of a major company interested in a major development scheme in a LDC. During the discussion the chairman of the company, disturbed by my suggestions that the company should consider points a, b, c and d before a major decision was made, asked why the pertinent environmental studies were not carried out by the government during the engineering feasibility stage? The answer was simple: there was nobody to do the study. In a country which may have a high illiteracy, one cannot expect to have an excess of highly qualified experts. I can quote an example even for Australia where a few years ago on the arrival of a Soviet oceanographic research vessel it was commented that the vessel was staffed with more marine scientists than one could find in the whole of Australia. While some developed industrialised countries have thousands of engineers and scientists and hundreds of research institutions and units, the LDCs have only a handful of scientists and engineers, a few institutions usually in their infancy, poor infrastructure, and supporting personnel of poor quality. This certainly slows down the work of an expert. A consultant may be invited and asked for an EIS. He may often be requested to collate available information as such work may be above the available manpower in the country. However, there may be the right person already within the country who will be too occupied with other tasks. It is of course a matter of priority and economy to decide whether to employ a costly consultant or to release the person already in the country for the task. My experience shows that the first case is more usual.

A suitable consultant is usually selected by a group of people who are immediately involved in the relevant project. Frequently international organisations such as U.N. are asked for advice. The completed EIS will receive full scrutiny in accordance with its magnitude and importance for the country. Often the consultant's report is referred to another consultant for further assessment. However, time is of importance too, especially for decision-makers, including politicians. Usually there is not enough time for the long-term painstaking collection of basic information. Samples of indicative value are gathered and interpreted which, of course, irritates the scientific community; they would prefer to have more time for the baseline work. Economic factors are of great importance and LDCs usually cannot afford the luxury of the long delays which are now becoming a regular feature of any major development in industrialised countries.

Concerning the question of extrapolation from one ecosystem to another, the use of case studies is sometimes instructive but they cannot always be applied adequately to new projects. Many new developments are environmentally diametrically different from anything that has been known for other situations of a similar nature. In LDCs the baseline data bank is usually of very poor quality, often completely inadequate for mathematical modelling. Thus an EIS may be based on a thin ground of scarce data. It is pointless to blame the consultant for this as he certainly does not have time to collect the great arsenal of data equivalent to that already available in industrialised countries. He also will not be able to submit a study equivalent in standard to reports of his equals working in a developed country.

There are also consultants who take up a task in a LDC and believe that knowledge and experience from industrialized countries can be directly applied. Their EIS may then be of little use for a LDC because of lack of manpower, high cost, political implications (large studies subcontracted to one foreign government only) and other reasons. Some EISs take little account of the vagaries of weather, insufficient transport infrastructure, lack of maintenance facilities for machinery and instruments. In connection with the last point, it is quite obvious that introducing highly sophisticated instruments to LDCs without importing highly qualified maintenance personnel is a waste of money. The lack of the most recent technology results in less precise chemical analytical data.

An EIS for a LDC should be written bearing in mind the problems of the particular country involved and in relation to global knowledge about the particular problem. Recommendations must be realistic and priorities defined, although the definition of priorities may be left to indigenous specialists (if such are available) who may better define them and fit them into the socio-economic context. Such a specialist then takes over the responsibility for the implementation of the project, his responsibility being much higher than that of the consultant who by that time is back in his own country. The indigenous specialist then follows the project through all stages and evaluates the results of the studies.

Any experienced consultant can confirm that working in a LDC is hard work where one has to apply himself in many fields, most of them involving the supporting infrastructure. Improvisation is an everyday necessity; tolerance and understanding the psychology of the people of different LDCs is important. Good working relations with indigenous persons are essential because without them the programme has only a slight chance of being implemented.

Not such a long time ago environmentalists were regarded by the scientific community as dilettantes. But environmentalists are quite frequently specialists, and those who prepare an EIS usually do the best that can be done under the circumstances (which vary according to the topic and the country). Perhaps there is a higher statistical probability of boondoggling an EIS in a developed country than in a LDC, as there are less EISs produced in LDCs.

I agree with Schindler that first-rate natural scientists are usually not attracted to undefined scientific problems, complex committee hierarchy (but the first-rate scientists are usually part of a hierarchy in their own set-up), and unrealistic time constraints (what is a realistic time, for example, for the evaluation of the impact of the long-term irradiation from nuclear power stations on human health?) that are part and parcel of many environmental studies. In LDCs, and perhaps also elsewhere, the best must be achieved with whatever resources are available, or for what a country can afford to pay. If EIS requirements are unrealistic, or unrealistically high standards are set, the politicians and decision-makers may turn a blind eye towards any recommendations and the result of such an EIS may be more harmful than beneficial. There is a need for compromise, which may be based on tough negotiations between environmentalists and decision-makers. Any development has its negative impact. If economic development is part of the government policy (and name a government in which it is not) there will always be problems with some negative environmental impact. Consultants have to define them and suggest alternatives and improvements.

Thus, for the above reasons, EISs appear to be fully justified both in LDCs and industrialised countries.

Tomi Petr

Dr Tomi Petr, Environmental Manager of the Office of Environment and Conservation, Central Government Offices, Waigani, Papua New Guinea, has accepted a position as Fishery Resources Officer of the Inland Water Resources and Aquaculture Service, Fishery Resources and Environment Division of Food and Agriculture Organisation (FAO), Rome, Italy, *as from February 1980.*

Dr Petr worked on fish ecology, limnology and health problems of large tropical man-made lakes, natural lakes and rivers in Africa (Ghana, Uganda, Tanzania, Kenya) and on a number of environmental aspects of large engineering schemes such as damming rivers and waste disposal from large open-cut mines in Papua New Guinea. He has just completed a three-years assignment for the Government of Papua New Guinea as Purari River Environmental Manager, to which position he was seconded by the Commonwealth Fund for Technical Cooperation.

In Rome Dr Petr will participate in the Service's programme with respect to fisheries research and the appraisal, protection and development of inland fishery resources, including the aquatic environment.

BOOKS NOTICED

"Australian Freshwater Life", by W.D. Williams. Second edn. MacMillan, South Melbourne, Australia. Format: 336 pp. Price: hardback $29.95; paperback $14.95.

This completely revised and updated version of the classic work on Australian freshwater life provides basic information on the biology of free-living invertebrates (insects, snails, worms, crustaceans, etc.) of Australian lakes, streams and other inland waters.

The text has been broadened to make it more accessible to the general reader, amateur collector and untrained naturalist. A completely new introductory section sets out useful information for the amateur which covers such things as equipment for collecting, preserving techniques, typical habitats, etc..

In the next issue of the Newsletter, this book will be reviewed. A good point of this edition - one which is immediately noticeable - is that the unintentional loose-leaf binding of the first edition has been replaced by a more solid form of binding.

As a result of negotiations with the publisher, the A.S.L. is able to offer to members copies of this book with a special 20 per cent discount. Enquiries to: Ian Campbell, Water Studies Centre, Caulfield Institute of Technology, Caulfield East, Victoria 3145.

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"Freshwater Fishes of South-eastern Australia (New South Wales, Victoria and Tasmania)", edited by R.M. McDowall. Published by A.H. & A.W. Reed Pty Ltd, Sydney. 1980. Price: $19.95.

This book will be reviewed in the next issue of the Newsletter.

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"Field Guide to the Non-marine Molluscs of South-eastern Australia" by Brian J. Smith and Ron C. Kershaw. 1979. Published by Australian National University Press, Canberra. Paperback $9.50.

As for the two books mentioned above, this book will be reviewed in the next issue of the Newsletter.

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PAPERS AND REPORTS

1. Wilderness in Victoria: an Inventory, by M. Feller, D. Hooley, T. Dreher, I. East and R. Jung, 1979. Monash Publications in Geography, No. 21.

2. The Use of Organisms to Assess Pollution of Fresh Waters: a literature survey and review, by I.A.E. Bayly and P.S. Lake. Ministry for Conservation Environmental Studies Series Report. Publication No. 258: 1-73.

/3.

3. Aquatic Sciences Research in Australia since 1950: an analysis of trends, by I.A.E. Bayly, 1979. Australian Fisheries, December 1979. 21, 22, 27, 23, 24.

This paper is taken from, but does not represent the full text of, Ian Bayly's A.S.L. Presidential Address given at Tallangatta in May 1979. Readers are reminded of the unusual sequence of pages.

BOOK REVIEW

"Lake Chilwa. Studies of change in a tropical ecosystem"
Edited by Margaret Kalk, A.J. McLachlan & C. Howard-Williams. 1979.
Published by W. Junk, The Hague, as Monographiae Biologicae Vol. 35.
XVIII + 462 pp. ISBN 90 6193 087 1. Price US$78.95.

Reviewed by
Dr T. Petr, Fishery Resources Officer of the Inland Water Resources and Aquaculture Service, Fishery Resources and Environment Division of FAO, Rome, Italy.

Lake Chilwa is a small endorheic lake in Malawi in Central Africa, just outside the Rift Valley. Due to its eminent importance in the Malawi economy, and also for the fulfilment of academic curiosity the lake and its catchment basin was studied for ten years by a group of 18 scientists resident in Malawi. These studies are summarized in the present monograph, which continues in the tradition of valuable limnological and environmental publications published by Dr W. Junk of The Hague.

It should be stressed that this book has not a purely limnological character, although perhaps some 65 per cent of it is concerned with limnology and fish. The lake story is set in the broad context of its terrestrial environment, which is relatively densely populated, and in the last 100 years has been under great pressure.

The unusual feature of Lake Chilwa which makes it stand out from the other productive African lakes is that it undergoes periodically - in long intervals - a complete drying out. After initiation of the present studies in 1966 the lake passed through one of these infrequent complete dry-out and reflooding phases. The drying-out initially perplexed the limnologists and fish biologists who saw their precious medium evaporating in front of their eyes. But the benefits of this unusual phenomenon were soon recognised. Data collected on the transition stages of drying out and reflooding, with all the multitude of ecological implications for the biota, physico-chemical and socio-economic environment are related to some of the five kinds of change in the Chilwa basin: catastrophic change, periodic change, seasonal fluctuations, changes in geological time, social changes.

Lake Chilwa, less than 5 m deep and almost 2,000 km^2 in area at the end of the wet season when in flood, occupies the centre of hot, low-lying plains. Chemically Lake Chilwa water chlorinity and alkalinity are almost equal over a range of conductivities (50 to 12,000 uS cm^{-1}); alkalinity surpasses chlorinity only at high conductivities. In a year of normal depth (about 70 per cent of the 26 years on record), the conductivity ranges between 1,000 and 2,500 uS cm^{-1}. The major ions in Lake Chilwa are Na^+, Cl^- and HCO_3^-, with pH values varying between 8 and 9. Surface water temperatures vary between 20° and 39°C, but there is no stable thermal stratification due to the shallowness of the water. The continuous mixing of the water results in high turbidity.

A broad belt of dense Typha dominguensis swamp surrounds the lake. These marginal swamps, when compared with the open lake, provide great spacial variation in environmental factors. Howard-Williams sees the high conductivity of the water and high alkalinity of Lake Chilwa muds as being the reason for the absence of Cyperus papyrus, the marginal swamp plant of many African lakes. High conductivities in the drying out phase of the lake affect all communities, and, for example, they appear to force zooplankton into diapause (Kalk).

/In 1968

In 1968 during the dry season the lake disappeared for about ten weeks. Water remained during that time only in the numerous lagoons in the swamps. This extremely dry period was then followed by a recovery phase, and by 1977-1978 the lake reached its maximum level. An interesting phenomenon was followed during the reflooding of the lake: a dense population of chironomid larvae was following the advancing shoreline, leaving an unoccupied space of increasing size in the lake centre (McLachlan). Experiments demonstrated that the mud became uninhabitable in deeper waters because of the precipitation of a fine sediment derived from erosion of the lake basin at the shoreline. Eventually the swamp vegetation became the major habitat for benthos (McLachlan, Cantrell). One might compare the reflooding of Lake Chilwa with Lake Eyre in Australia which fills up with fresh water at infrequent intervals. This results in fish and chironomid explosion, which, in turn, is followed by tremendous mortality of all freshwater or saline water opportunists as Lake Eyre gets increasingly more saline and eventually evaporates. However, while in the case of Lake Chilwa the dry-out stage is an exceptional phenomenon, in the case of Lake Eyre the dry stage is usual.

The instability of Lake Chilwa has wide implications for the fundamental features of the ecosystem, such as the food-web and the encroaching vegetation. It affects the fisheries which are of economic importance to Malawi since they are the main source of dietary protein for the major industrial area as well as for the people on the Chilwa plain. After the dry-out phase in 1968 the recovery took several years, with the catfish Clarias recovering fastest, followed by Barbus and finally by Sarotherodon. The recovery of the last genus was boosted by restocking the lake with 300,000 fingerlings from fish ponds. Experimental fishing in 1970-1972 indicated that Lake Chilwa has a remarkable resilience. In 1976 20,000 tons of fish were captured. This fishing intensity is not considered as endangering the fish stock. The open lake fishery has still a lot of potential.

Those very few species of fish which live in the open water of Lake Chilwa have a very wide tolerance of changes in temperature, salinity, alkalinity and turbidity. The Chilwa streams and swamps are inhabited by a diverse riverine fauna, some of which are well adapted to swamps (Furse et al). Interesting information on undergoing speciation of Sarotherodon shiranus is discussed by Kirk. This species has two subspecies in the lake, of which S. s. chilwae is suggested as being a subspecies in the making, thus giving another example of fish speciation in African lakes.

Socio-economic studies deal with land problems (Pachai, Agnew), fishery, health, education (Kalk) and problems of entering cash economy. Some focus on malnutrition, and diseases such as bilharziasis and malaria. The intermediate host of the Schistosoma parasite, the snail Bulinus globosus, is common and the deeper swamp channels serve as important foci of cercarial transmission.

The Chilwa area is one of the most densely populated in rural Africa south of the Sahara and practically every facet of life in the ecosystem depends in some way upon the fluctuating lake level. The book highlights the problem of increasing population pressure on natural resources of the area, with the exception of fish. While it is nature which exerts pressure on the fish stock, the human population affects all the other at present usable natural resources of the Lake Chilwa catchment, such as arable land and forests. Modern knowledge, together with traditional and modern techniques, would appear at present to be the most suitable for rehabilitation of some of the overexploited resources.

The book is a valuable contribution to our knowledge of African tropical environments undergoing rapid changes exerted by population pressure. Malawi, with its economic and political stability, is one of those few African countries in which such solid ten-year-long research is still possible. Even in Africa the research based on expeditionary visits appears to be a matter of the past, and long term investigations are desirable for the advancement of our scientific knowledge.

In spite of the high cost, the book is a good investment for professional limnologists, fish biologists and those who are concerned with applied aspects of science and development.

P.H.D. THESIS - MONASH UNIVERSITY

ECOLOGICAL STUDIES OF FRESHWATER TURTLES IN SOUTH-EASTERN AUSTRALIA by Bruce C. Chessman.

A study was made of the general and physiological ecology of three species of side-necked turtles occurring in south-eastern Australia: the broad-shelled turtle, Chelodina expansa, the snake-necked turtle, Chelodina longicollis, and the Murray turtle, Emydura macquarii.

In the Murray Valley of southern New South Wales and northern Victoria all three species coexist. In this region C. longicollis, the smallest species, has the slowest growth rate, and may reach sexual maturity at an age of about 8-12 years, which compares with 9-12 years in C. expansa, the largest species, and 6-8 years in E. macquarii. Distinctive morphological features are the long necks of the Chelodina species and the protection afforded to C. longicollis by its broad plastron. Gonadal examinations revealed that in C. longicollis follicular enlargement occurs in autumn and ovulation in spring, while in E. macquarii both events occur in spring. Multiple clutches are common in both species. Male reproductive cycles of both species feature testicular enlargement and probably spermiogenesis in autumn. Gonadal cycles of C. expansa were not determined.

Unlike C. expansa and E. macquarii which prefer large, deep water bodies, C. longicollis occupies all types of aquatic habitat, and frequently migrates overland between water bodies. Activity of the Chelodina species peaks in early morning and afternoon, while E. macquarii is most active near midday. Activity declines less dramatically in winter in C. longicollis than in the remaining species. The Chelcdina species are carnivorous: C. expansa feeds primarily on active prey, especially decapod crustaceans and fish, while C. longicollis feeds on smaller invertebrates, especially zooplankton, and also eats carrion. The diet of E. macquarii consists primarily of aquatic plants, plant debris, periphyton and carrion. Diets of all species vary considerably with habitat, but size and sex-related differences are minor. Feeding success varies seasonally and with habitat. Movements, mortality, ectoparasites and ectocommensals of all three species are discussed.

In the Latrobe Valley in south-eastern Victoria, C. longicollis occurs allopatrically. Distinctive features of this population are small body size, an extremely slow rate of growth, small clutch size, a long nesting season and frequent overwintering of hatchlings in the nest. Estimated population density averages 2.0 turtles per 100 m^2. Survivorship of eggs and nestlings is very low, but adult survivorship is high and some turtles reach great age. Movements between water bodies are frequent, but generally over short distances, and overland migration is concentrated in spring and early summer. The diet is diverse, and consists primarily of aquatic insects.

C. longicollis is adapted to semi-arid habitats by, inter alia, a low rate of evaporative water loss and an ability to aestivate. This species is also the most active at low temperatures, and has a low critical minimum temperature. Thermoregulatory behaviour, principally aquatic and atmospheric basking, is most common in E. macquarii and may not occur in C. expansa. The frequency, occurrence and significance of behavioural temperature regulation are discussed. In common with other reptiles, these turtles are able to heat and cool at different rates under controlled conditions. Data are presented on the relationships between heating and cooling time constants and environmental medium, species and body weight.

The comparative ecology of these turtles indicates a wide adaptive radiation within the Australian Chelidae.

Bruce gained his Ph.D. in 1979. He was supervised by a triumvirate of Professor J.W. Warren, Associate Professor A.K. Lee and Dr. P.S. Lake of the Department of Zoology, Monash University.

M.ENV.SCI. THESIS - MONASH UNIVERSITY

BILLABONGS OF THE YARRA VALLEY METROPOLITAN PARK - SOME ECOLOGICAL AND RECREATIONAL CONSIDERATIONS by David N. Hodges.

This study has investigated some ecological and recreational considerations of five billabongs within the Yarra Valley Metropolitan Park (Y.V.M.P., or Park). This newly created public park stretches from Kew to Warrandyte along the Yarra River, and the two main objectives for this park's future use are recreation and conservation.

Of the many billabongs within the Park, five relatively large and permanent billabongs were selected, representing a range of existing and potential land uses, locations and ecological conditions. The ecological study primarily involved the following considerations - water quality (over a consecutive winter and summer period), invertebrates of the nekton and the benthos, fish diversity, bird habitats and vegetation. The general conclusion of this study was that three billabongs were in a "poor" condition, another was in a "fair" condition, and the fifth was in a "satisfactory" condition, when compared with billabongs in the "natural" state.

The recreational study involved a survey of Park users to elicit information on their recreational behaviour patterns and their attitudes to the environmental condition of the billabongs and the Park in general. The conclusions of this sruvey were that the public highly valued the Park; that they considered the environmental conditions of the Park, and the billabongs in particular, were good; that they had shown very little discrimination in their value judgements; and that generally they had very little understanding of the environmental impact of a variety of recreation uses on the Park itself.

On the basis of these ecological and recreational studies, and other related information, a set of recommendations were formulated for the future utilisation of the five billabongs considering the Park's stated aim of recreation and conservation. The recommendations include a classification of future use for each billabong and suggested management strategies required to achieve these perceived goals of use.

HONOURS THESIS 1979 - MONASH UNIVERSITY

ASPECTS OF THE POPULATION ECOLOGY OF THE YABBIE (CHERAX DESTRUCTOR) IN TWO VICTORIAN FARM DAMS by E. Dane de Kretser

Research was conducted on aspects of the population ecology of the yabbie (C. destructor) in southern Victoria. Particular attention was paid to the population of yabbies in two farm dams, henceforth referred to as the Top and Bottom Dams. The Top Dam also contained a large population of tench (Tinca tinca) and possibly some trout (Salmo trutta). The study was mainly centred around the population of yabbies in the Bottom Dam.

The bottom dam showed oxygen and temperature stratification in summer and was destratified by late April. Low levels of dissolved oxygen (8%) were recorded in deep water.

Yabbies were captured using baited drum net traps.

Carapace length-frequency histograms suggest that the maximum life span of wild populations of C. destructor in southern Victoria may be 3 years.

Yabbies in the Top Dam were larger than those in the Bottom Dam. This size difference may be associated with the lower density of yabbies in the Top Dam, possibly as a consequence of fish predation.

Interpretations of catchability and mortality and recruitment rates suggest that two year old females may moult later in the year than three year old females.

In summer, yabbies were more abundant in shallow water possibly due to a preference for the higher oxygen levels occuring in these regions. When the Bottom Dam destratified, yabbies were more abundant in deeper water. This may be due to lower bird predation in this region or a response to the greater food resources which may have been previously unattainable in deeper water due to low oxygen levels.

Burrows were located mainly in shallow water possibly because the substrate may not have been able to support them in deeper water or, alternatively, due to the higher oxygen levels in shallow water. It is also conceivable that the presence of burrows in shallow water may be a response to moulting and to predation pressures when yabbies are abundant in this region.

Very little growth occurred during the study period probably due to low water temperatures.

The little pied cormorant was the only observed bird predator of yabbies. Bird predation was greatest in the shallow regions of the Bottom Dam and also greater in summer than in autumn and winter. Cormorants showed a preference for larger yabbies.

Analysis of the contents of the stomach of tench and of the gastric mill of yabbies indicated that tench and yabbies were utilising the same food resource (detritus).

Yabbies dominated the macroinvertebrate benthic biomass of the Top and Bottom Dams in comparison with biomass values for the other macroinvertebrates obtained with an Ekman-Birge grab ($26gm/m^2$ and $93gm/m^2$ for yabbies cf. $6.2gm/m^2$ and $11.5gm/m^2$ for the other macroinvertebrates respectively).

In summer, yabbies were more active at night possibly due to greater daytime bird predation during this period. However, laboratory experiments indicated that C. destructor has a well defined nocturnal circadian rhythm of locomotory activity. In winter there was no significant difference between pre-sunset and post-sunset catch rates and this may reflect the importance of water turbidity in influencing yabbie locomotory activity.

THE EFFECTS OF RIVER IMPROVEMENT (CHANNELIZATION) ON FISH AND AQUATIC INVERTEBRATES IN THE BUNYIP RIVER, VICTORIA by Kent Hortle

(a) Methods

1. Three sites each 50 metres in length in an unchannelized section of the Bunyip River and three sites also 50 metres in length, in a channelized portion of the same stream, were selected for study. At all sites fish and invertebrates were sampled in autumn, winter and spring. Measurements of several characteristics of the habitat and water quality were also made in each season.

2. Attempts were made using canonical correlation analysis, to determine the effect that changes in the features of the habitat had on abundances of invertebrates and fish. In addition, the habitat preferences of fish were recorded during electroshocking.

3. Gut contents of fish were examined in an attempt to determine whether the distribution of fish was affected primarily by the distribution of their prey.

(b) Results

1. There were major differences in characteristics of the habitat at different sites and minor differences between sites in values of physico-chemical parameters.

2. There were no significant differences in invertebrate abundance or diversity between sites but seasonal changes were different at different sites.

3. Differences between sites in the direction of seasonal changes in invertebrate abundance appear to reflect the availability of detritus at each site.

4. Few species of invertebrate differed in abundance between sites, but for those species that did, the differences could possibly be accounted for by differences in substrate stability, detrital cover, the extent of fluctuations in flow rate, or a differential effect of fish predation.

5. The results of a simplistic similarity analysis suggest that the invertebrate fauna inhabiting the stream directly above a drop-structure is different to that found at channelized sites away from the drop-structure. The composition of the invertebrate fauna in the unchannelized areas is similar at all sites and all the unchannelized sites are dissimilar to all channelized sites. The groupings of sites on the basis of faunal similarity is identical with their grouping on the basis of several habitat characteristics, suggesting that the characteristics (detritus, current speed and substrate stability) are the most important ones affecting invertebrate distribution.

6. Standing crop of fish was highest at two unchannelized sites where cover was abundant; standing crop was lower at one unchannelized site and the channelized site above the weir, where cover was intermediate. At two channelized sites below the drop-structure, the abundance of fish and the number of species present were lowest. Good correlations were observed between "cover" (the area of snags and the length of bank fringed by vegetation) and the number of species and the abundance of fish, consistent with the observed habitat preferences of several species.

7. There was little evidence that the availability of food was a cause of the differences in fish populations between sites. It is concluded therefore that most of the differences observed were ultimately due to differences in the structure of the habitat, with some species possibly being displaced from favourable areas by competition or predation, or both.

8. The construction of drop-structures would appear to have a mitigating effect on the reductions in fish abundance and diversity which invariably accompany channelization.

9. The conclusions of this study are in general agreement with the conclusions of previous work.

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THE MACROINVERTEBRATE FAUNA OF ROCKS IN AN UPLAND, TEMPERATE STREAM: COMPOSITION AND DYNAMICS, by Tim Doeg.

The macroinvertebrate fauna inhabiting the surfaces of rocks in an upland, temperate stream was investigated over a seven month period, using a specially designed sampling apparatus. The performance of the device compared favourably with other described methods for sampling rock fauna. It collected significantly more of the very active species Baetis sp. ($p < 0.01$), Atalonella sp. ($p < 0.05$) and Paramoera fontana ($p < 0.01$) than caught by the hand-net method of Macan (1958). It also collected more individuals per rock ($p < 0.05$) and more species per rock ($p < 0.05$), presumably by preventing the escape of individuals and rarer species.

A new field method of evaluating the surface area of rocks was described and tested. "Gladwrap", a thin-film, self-adhesive, polythene plastic food wrap, was used to cover the surface. The area of wrap used could be related to the surface area of the rock. This method proved accurate to within 8.8% for spheres and 5% on other regular geometric shapes. By wrapping a single rock eleven times, it was shown that the method was repeatable with little variation between the accuracy of successive measurements.

The rock fauna consisted of a highly diverse community showing seasonal variations in species richness, diversity and total density. Individual taxa also showed distinct seasonality which could be related to their life histories, where these were known.

The distribution of many taxa was determined by variations in the abiotic environment. Positive intercorrelations between pairs of species were frequent and probably due to similar reactions of each member of the pair to a single environmental variable. No evidence for significant competitive or predatory interactions was found.

The colonization of denuded rocks resulted in a steady increase in species richness and diversity with no distinct evidence for competitive assortment of species.

Exclusion of one dominant species, Agapetus sp. did not result in a concomitant increase in the numbers of any other species, possibly indicating the lack of competition for space in the system.

The results support the hypothesis of Stout and Vandermeer (1975) that temperate stream communities are controlled by "regional" factors (the abiotic environment) with little or no influence from "local" factors (biotic interactions).

The three celebrities were "supervised" (i.e. cajoled and threatened) by P.S.Lake.